Practice Tests (Set 21) – 1H

Q		Working	Answer	Mark	Notes
1	(a)	$n^2 - 6n + 4n - 24$		2	M1 for any 3 correct terms **or** for 4 out of 4 correct terms ignoring signs **or** for $n^2 - 2n$ … **or** for …$- 2n - 24$
			$n^2 - 2n - 24$		A1 oe
	(b)	$8x - 12$ **or** $\frac{3}{4}x - \frac{5}{4}$ oe or $0.75x - 1.25$ oe		3	M1 for correct multiplication by 4 **or** separate fractions on the RHS
		$8x - 3x = -5 + 12$ oe or $5x = 7$ oe **or** $2x - \frac{3}{4}x = -\frac{5}{4} + 3$ or $2x - 0.75x = -1.25 - 3$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation and number terms on the other
			$\frac{7}{5}$		A1 oe dep on M1 1.4 or $1\frac{2}{5}$ oe
					Total 5 marks

Q		Working	Answer	Mark	Notes
2	(a)		0.8 and 0.2 0.3 and 0.7 0.6 and 0.4	2	B2 for all 3 correct pairs of probabilities on the correct branches (B1 for 2 correct pairs of probabilities on the correct branches) Allow equivalent fractions
	(b)	"0.8" × "0.3"		2	M1ft (Both probabilities must be less than 1)
			0.24		A1ft oe
					Total 4 marks

Q		Working	Answer	Mark	Notes
3	(a)		8.9×10^{-5}	1	B1
	(b)		83 400	1	B1
					Total 2 marks

Q		Working		Answer	Mark	Notes
4	(i)	$(x \pm 3)(x \pm 8)$		2	M1	Or $(x + a)(x + b)$ where $ab = -24$ **or** $a + b = 5$
			$(x - 3)(x + 8)$		A1	
	(ii)		3, −8	1	B1ft	ft from their incorrect factors if M1 scored in (i)
						Total 3 marks

Q	Working	Answer	Mark	Notes
5	$\frac{16}{3}-\frac{20}{7}$ or $(5)\frac{7}{21}-(2)\frac{18}{21}$ or $(5)\frac{7a}{21a}-(2)\frac{18a}{21a}$		3	M1 for correct improper fractions or fractional part of numbers written correctly over a common denominator
	$\frac{112}{21}-\frac{60}{21}$ or $\frac{112a}{21a}-\frac{60a}{21a}$ or $5\frac{7}{21}-2\frac{18}{21}=3-\frac{11}{21}$ oe			M1 for correct fractions with a common denominator or a multiple of 21
	$\frac{112}{21}-\frac{60}{21}=\frac{52}{21}=2\frac{10}{21}$ oe or $3-\frac{11}{21}=2\frac{10}{21}$	Shown		A1 Dep on M2 for a correct answer from fully correct working
				Total 3 marks

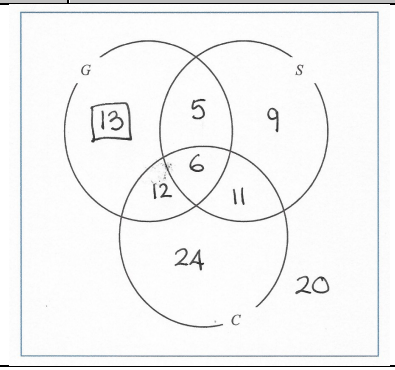
Q	Working	Answer	Mark	Notes
6			3	M1 for $d = 9$ or $(c + d) \div 2 = 8$ or $d - a = 4$
				M1 for two of the above
		$a = 5$, $b = 6$, $c = 7$, $d = 9$		A1 All correct
				Total 3 marks

Q	Working	Answer	Mark	Notes
7	eg $\begin{matrix}+7x+3y=3\\ 9x-3y=21\end{matrix}$ or $\begin{matrix}-21x+9y=9\\ 21x-7y=49\end{matrix}$ or eg $7x+3(3x-7)=3$ or $7\left(\frac{7+y}{3}\right)+3y=3$		3	M1 A correct method to eliminate x or y – multiplying one or both equations so that one value can be eliminated and the correct operation to eliminate or for substitution of one variable into the other equation.
				M1 A correct method to calculate the other letter eg substitution or starting again with elimination or substitution
		$x = 1.5$, $y = -2.5$		A1
				Total 3 marks

Q	Working	Answer	Mark	Notes
8	28 × 12 (=336)		4	M1 For a correct method to find the area of the rectangle (may be seen as part calculation)
	28 × 12 + 0.5 × (28 – 5 – 5 + *CD*) × (20 – 12) = 434 oe eg 0.5 × (18 + *CD*) × 8 = 434 – 336			M1 A correct equation involving *CD*
	Eg "288" + 16*CD* = "196"			M1 A correct simplified (no fractions or brackets) equation for *CD*
		6.5		A1
				Total 4 marks

Q		Working	Answer	Mark	Notes
9	(a)		8	1	B1
	(b)		11	1	B1 accept x^{11}
	(c)		$8k^6m^{12}$	2	B2 for all correct B1 for two correct from 8 or k^6 or m^{12}
					Total 4 marks

Q		Working		Answer	Mark	Notes
10	(a)		7, 32, 52, 64, 71, 76, 80	1	B1	
	(b)			2	B2	Fully correct cf graph – points at ends of intervals and joined with curve or line segments. If not B2 then B1(ft from a table with only one arithmetic error) For 6 or 7 of their points at ends of intervals and joined with curve or line segments OR for 6 or 7 points plotted correct at ends of intervals not joined OR for 6 or 7 points from table plotted consistently within each interval (not at upper ends of intervals) at their correct heights and joined with smooth curve or line segments.
	(c)		32-34	1	B1	Any value in range
	(d)			3	M1	For readings taken at 18 and 65 (eg 6 and 74)
		eg (74 – 6) × 0.6 oe			M1	ft
			39 - 43		A1	ft their graph but answer must be whole number
						Total 7 marks

Q	Working	Answer		Mark	Notes
11		Fully correct Venn diagram	3	B1 B2	For 13 correct in *G* only For all 7 others correct (B1 for 4, 5 or 6 others correct)
					Total 3 marks

Q	Working	Answer	Mark	Notes
12 (a)			2	M1 for $4n + k$ ($k \neq -3$) or $4 \times n + k$ ($k \neq -3$) or $n \times 4 + k$ ($k \neq -3$) (k may be zero or absent)
		$4n - 3$		A1 oe e.g. $1 + (n - 1)4$ oe or $4 \times n - 3$ oe or $n \times 4 - 3$ oe NB: award full marks for eg $x = 4n - 3$ oe or $x = 4 \times n - 3$ oe or $x = n \times 4 - 3$ oe or nth term $= 4n - 3$ oe or nth term $= 4 \times n - 3$ oe or nth term $= n \times 4 - 3$ oe but only M1 for $n = 4n - 3$ oe
(b)		$6m + 5$	1	B1 for $3(2m) + 5$ oe or $6m + 5$ or $3 \times 2m + 5$ oe or $6 \times m + 5$ Allow $3(2n) + 5$ or $6n + 5$ oe
				Total 3 marks

Q	Working	Answer	Mark		Notes
13 (a)	eg $\frac{2(4x+5)-3(3-2x)}{6}=13$ oe or $2(4x + 5) -3(3 – 2x) = 13 \times 3 \times 2$ oe		4	M1	Writing fractions over a common denominator or removing denominator
	eg $8x + 10 – 9 + 6x = 78$			M1	Removing brackets and fractions
	eg $8x + 6x = 78 – 10 + 9$ oe eg $14x = 77$			M1	Terms in x on one side and number terms the other in a correct equation.
		5.5		A1	dep on M2
(b)	$(2y + 5)(y − 6)$		3	M1	For correct factorisation or correct use of quadratic formula
	$y = 6, y = −2.5$			M1	Correct critical values
		$−2.5 \square y \square 6$		A1	oe
					Total 7 marks

Q	Working	Answer		Mark	Notes
14 (a)	$(5-x)(2x+3) = 10x + 15 - 2x^2 - 3x$ $(= -2x^2+7x+15)$ $(5-x)(x+4) = 5x + 20 - x^2 - 4x$ $(= -x^2 + x + 20)$ $(2x+3)(x+4) = 2x^2 + 8x + 3x + 12$ $(=2x^2+11x+12)$		3	M1	The product of 2 brackets 3 out of 4 terms correct	M2 for 6 (out of a maximum of 8) of $10x^2+15x+40x+60-2x^3-3x^2-8x^2-12x$ (M1 for 4 or 5 terms correct out of a maximum of 8)
	$(-2x^2+7x+15)(x+4)=$ $-2x^3-8x^2+7x^2+28x+15x+60$ $(-x^2+x+20)(2x+3)=$ $-2x^3-3x^2+2x^2+3x+40x+60$ $(2x^2+11x+12)(5-x)=$ $10x^2-2x^3+55x-11x^2+60-12x$			M1	ft for 4 terms correct	
		$-2x^3-x^2+43x+60$		A1	cao (terms may be in any order but must be simplified)	
(b)	$g+7=\frac{c+3}{4+c}$ or $g(4+c)=c+3-7(4+c)$		4	M1	Adding 7 to both sides or removing fraction	
	eg $4g + gc + 28 + 7c = c + 3$ or $4g + gc = c + 3 - 28 - 7c$ oe			M1	Removing fraction and expanding all brackets	
	eg $gc + 7c - c = 3 - 28 - 4g$ or $28 - 3 + 4g = c - 7c - gc$			M1	Terms in c on one side and other terms on the other side in a correct equation	
		$c=\frac{-(4g+25)}{g+6}$		A1	oe eg $c=\frac{25+4g}{-6-g}$	
						Total 7 marks

Q		Working		Answer	Mark	Notes
15	(a)			5	1	B1 cao
	(b)	$y(x-6)=2x$ or $yx-6y=2x$	$x(y-6)=2y$ or $xy-6x=2y$		3	M1 for multiplying the denominator
		$x(y-2)=6y$	$y(x-2)=6x$			M1 for isolating the x or y terms **and** factorising
				$\frac{6x}{x-2}$		A1 accept $\frac{-6x}{2-x}$ (must be a function of x)
						Total 4 marks

Q	Working	Answer	Mark	Notes
16 (a)	$(3x \pm 2y)(3x \pm 2y)$ or $(3x)^2 - (2y)^2$		2	M1
		$(3x+2y)(3x-2y)$		A1
(b)	$\frac{7(4x)}{32x} - \frac{8(x+3)}{32x}$ oe or $\frac{7(4x)}{8(4x)} - \frac{8(x+3)}{8(4x)}$ oe or $\frac{28x}{32x} - \frac{8(x+3)}{32x}$ oe or $\frac{28x}{32x} - \frac{8x+24}{32x}$ oe or $\frac{28x-8(x+3)}{32x}$ oe or $\frac{7x}{8x} - \frac{2(x+3)}{8x}$ oe or $\frac{7x-2(x+3)}{8x}$ oe		3	M1 for two correct fractions with common denominator **or** a single correct fraction
	$\frac{28x-8x-24}{32x}$ oe or $\frac{20x-24}{32x}$ oe or $\frac{7x-2x-6}{8x}$ oe or $\frac{20x}{32x} - \frac{24}{32x}$ oe or $\frac{28x}{32x} - \frac{8x}{32x} - \frac{24}{32x}$ oe			M1 for correct fraction(s) with bracket(s) expanded **and** dealing with the negative signs
		$\frac{5x-6}{8x}$		A1 or $\frac{-6+5x}{8x}$
				Total 5 marks

Q	Working	Answer	Mark	Notes
17	$(a=)\dfrac{14}{3\times\dfrac{7}{4y-3}-7}$	3	M1	For a correct substitution
	$(a=)\dfrac{14(4y-3)}{21-7(4y-3)}$ oe eg $\dfrac{56y-42}{21-28y+21}$		M1	Or for a correct but unsimplified answer
		$\dfrac{4y-3}{3-2y}$	A1	oe but must be simplified
				Total 3 marks

Q	Working	Answer	Mark	Notes
18	$\frac{12}{\sqrt{2}-1}\times\frac{\sqrt{2}+1}{\sqrt{2}+1}$ or $\frac{12}{\sqrt{2}-1}\times\frac{-\sqrt{2}-1}{-\sqrt{2}-1}$ **and** $4\sqrt{2}$ or $2\sqrt{8}$ or $\sqrt{32}$ oe		3	M1 for showing a correct method for rationalising the denominator **and** dealing with $\left(\sqrt{2}\right)^5$
	E.g. $12\sqrt{2}+12-4\sqrt{2}$ or $8\sqrt{2}+12$ $12\sqrt{2}+12-2\sqrt{8}$ or $12\sqrt{2}+12-\sqrt{32}$ oe			M1 dep expression must be in surd form
	E.g. $12\sqrt{2}(+12)-4\sqrt{2}=8\sqrt{2}(+12)=2\sqrt{4^2\times2}(+12)=2\sqrt{32}(+12)$ or $12\sqrt{2}(+12)-2\sqrt{8}=6\sqrt{8}(+12)-2\sqrt{8}=4\sqrt{8}(+12)=2\sqrt{4\times8}(+12)=2\sqrt{32}(+12)$ or $12\sqrt{2}(+12)-\sqrt{32}=3\sqrt{4^2\times2}(+12)-\sqrt{32}=2\sqrt{32}(+12)$ oe Note $8\sqrt{2}=2\sqrt{4^2\times2}$ or $2\sqrt{16\times2}$ or $\sqrt{32\times4}$ or $\sqrt{64\times2}$ $12\sqrt{2}=3\sqrt{4^2\times2}$ or $3\sqrt{16\times2}$ or $\sqrt{32\times9}$	Shown		A1 dep on M2 for showing working to given answer (they may dismiss the +12 and just deal with the surd part for this stage)
				Total 3 marks

Q	Working		Answer	Mark	Notes
19	eg $\frac{2\times3\times3\times(3^{\frac{3}{2}})^{4n+6}}{2\times3\times3^{2(2n+8)}}$ or $\frac{3\times3^{\frac{3}{2}(4n+6)}}{3^{2(2n+8)}}$		3	M1	For 2 of: writing 18 as 2×3^2 oe and 6 as 2×3 or cancelling 6 &18 writing $\sqrt{27}$ as $3^{\frac{3}{2}}$ writing 9 as 3^2
	eg $\frac{3\times3^{6n+9}}{3^{4n+16}}$ or $\frac{3^{6n+10}}{3^{4n+16}}$			M1	For use of only powers of 3 on numerator and denominator
		$2n - 6$		A1	oe eg $2(n - 3)$
					Total 3 marks

Q	Working	Answer	Mark	Notes
20	$-q\left(x^2-\frac{12}{q}x\right)+q$ or $-q\left(x^2-\frac{12}{q}x-\frac{q}{q}\right)$ oe		4	M1 for a correct factorisation of the expression or $b = q$ (must be stated)
	$-q\left[\left(x-\frac{12}{2q}\right)^2.....\right]$ oe or $-q\left[\left(x-\frac{6}{q}\right)^2.....\right]$ oe			M1 for starting the correct process to complete the square
	E.g. $-q\left(x-\frac{6}{q}\right)^2+\frac{36}{q}+q$ oe or $-q\left(x-\frac{12}{2q}\right)^2+\frac{144q}{4q^2}+q$ oe			M1 for a complete process of completing the square. (Does not need to be simplified)
		$a=\frac{36}{q}+q$ $b=q$ $c=\frac{6}{q}$		A1 oe a and c must come from a correct process of completing the square. (Does not need to be simplified)
				Total 4 marks

Q	Working	Answer	Mark	Notes
20 **ALT**	$a - bx^2 + 2bcx - bc^2$ oe or $-bx^2 + 2bcx - bc^2 + a$ oe or $b = q$		4	M1 for correctly multiplying out $a - b(x - c)^2$
	$2bc = 12$ or $a - bc^2 = q$ oe			M1 for correctly equating coefficients
	$c = \frac{12}{2q}$ or $a = q\left(\frac{12}{2q}\right)^2 + q$ or $c = \frac{6}{q}$ or $a = q\left(\frac{6}{q}\right)^2 + q$			M1 for correctly finding a or c (Does not need to be simplified)
		$a = \frac{36}{q} + q$ $b = q$ $c = \frac{6}{q}$		A1 oe (Does not need to be simplified)
				Total 4 marks

			Average score of candidates achieving grade:								
Qn	**Max score**	**Mean %**	**ALL**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**U**
1	5	88	4.38	4.96	4.88	4.71	4.30	3.59	2.65	1.56	0.52
2	4	87	3.46	3.96	3.91	3.76	3.40	2.76	1.87	1.01	0.38
3	2	91	1.82	1.95	1.93	1.87	1.81	1.68	1.50	1.20	0.87
4	3	86	2.58	2.98	2.93	2.80	2.49	2.05	1.31	0.51	0.10
5	3	87	2.61	2.90	2.84	2.74	2.57	2.25	1.80	1.21	0.59
6	3	84	2.51	2.93	2.83	2.67	2.40	1.99	1.31	0.66	0.30
7	3	80	2.40	2.94	2.84	2.61	2.15	1.61	1.02	0.42	0.08
8	4	80	3.19	3.95	3.80	3.45	2.83	2.08	1.19	0.53	0.14
9	4	79	3.14	3.89	3.59	3.23	2.75	2.25	1.75	1.16	0.49
10	7	69	4.81	6.28	5.66	4.89	4.08	3.09	2.06	1.09	0.37
11	3	65	1.96	2.83	2.50	1.97	1.38	0.86	0.39	0.11	0.05
12	3	65	1.94	2.72	2.30	1.90	1.49	1.15	0.73	0.38	0.13
13	7	58	4.06	6.36	5.18	3.83	2.43	1.50	0.83	0.35	0.07
14	7	58	4.05	6.22	4.90	3.80	2.76	1.87	1.04	0.39	0.07
15	4	54	2.17	3.70	2.72	1.79	1.13	0.76	0.52	0.28	0.09
16	5	40	2.02	3.86	2.39	1.53	0.91	0.55	0.27	0.13	0.02
17	3	26	0.79	1.70	0.87	0.53	0.26	0.12	0.05	0.01	0.00
18	3	19	0.57	1.55	0.50	0.17	0.06	0.02	0.00	0.00	0.00
19	3	13	0.39	1.21	0.21	0.06	0.02	0.01	0.00	0.00	0.00
20	4	9	0.36	1.11	0.18	0.07	0.03	0.02	0.02	0.02	0.01
	80	**62**	**49.21**	**68.00**	**56.96**	**48.38**	**39.25**	**30.21**	**20.31**	**11.02**	**4.28**

Suggested grade boundaries

Grade	**9**	**8**	**7**	**6**	**5**	**4**	**3**
Mark	62	53	44	35	25	16	8